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Material Safety Data Sheet

Battery Fluid, Acid (Electrolyte)

This Material Safety Data Information Sheet is principally directed to managerial, safety, hygiene and medical personnel. The description of physical chemical and toxicological properties and handling advice is based on experimental results and past experience. It is intended as a starting point for the development of health and safety procedures.

DOT LABELING REQUIREMENTS

Shipping Name:	Battery fluid, acid; Electrolyte battery acid
Class:	8
UN No.:	UN2796
WHMIS Classification	Class E, Corrosive, D1A
Packaging Group II	

HAZARDOUS INGREDIENTS/IDENTITY

Sulfuric Acid - 66° Baume	OSHA PEL	ACGIH TLV	CAS NUMBER	WEIGHT %
(Mineral Acid, Oil of Vitriol, H_2SO_4, sulfuric acid)	1mg/M³	1mg/M³	7664-93-9	31-39
WATER			7732-18-5	
40 CFR Part 372.45				61-69

Notification: Battery fluid, acid contains between 31 and 39% by weight of H_2SO_4 (CAS No. 7664-93-9) and is subject to the reporting requirements of section 313 of Title III of the superfund amendments and re-authorization act of 1986. It is also subject to the reporting requirements of 40 CFR part 372.

TOXICOLOGY DATA

Acute oral LD_{50}: 2,140 mg/kg in ratio, skin and eye irritation (rabbit): Corrosive inhalation 1 hour LC_{50} Rat: 347 PPM

PHYSICAL & CHEMICAL CHARACTERISTICS

Formula:	H_2SO_4
Formula Weight:	98.08
Physical State/ Description:	Clear, to yellowish liquid
Boiling Point:	32-38% = above 235 Degrees F
Flash Point:	Not applicable
Freezing Point:	32-38% = less than -49 Degrees F
Odor:	Acrid sharp unpleasant odor
pH:	Less than 1 (1% aqueous solution)
Specific Gravity:	32-38% = 1.240 to 1.280 (water=1)
Vapor Density:	3.4 (Air =1 at boiling point of sulfuric acid)
Vapor Pressure:	32-38% = Less than 1mmHG at 100°F (37.8°C)
Water Solubility:	Soluble in all proportions
Reportable Quantity:	1,000 lb./454 Kg. As H_2SO_4

HMIS RATINGS

Health	3
Flammability	0
Reactivity	2
Personal Protection	D

HAZARD INDEX

0 = Insignificant
1 = Slight 2 = Moderate
3 = High 4 = Extreme

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FIRE & EXPLOSION DATA	Flash Point:	Will not burn, non-flammable
	Auto-Ignition Temperature:	N/A, Not combustible
	Extinguisher Media:	Dry Chemical or CO_2 small fires. Use media appropriate for surrounding material. Use water spray to cool containers exposed to fire; do not get water inside containers.
	Special Fire Fighting Procedures:	Do not direct water into acid tanks. Cool outside of tank with water. Wear full-face, self-contained respirator, rubberized outerwear, gloves, boots.
	Unusual Fire and Explosive Hazards:	Sulfuric acid will not burn, but can start fires with organic material, nitrates, carbides, chlorates and metal powders. Flammable hydrogen gas can form when acid contacts most metals. Hydrogen may accumulate in containers, avoid ignition sources, spill over into sewers may generate hydrogen gas or toxic sulfides. Addition of water to acid causes heat and possible splattering.
PHYSICAL HAZARDS (REACITVITY DATA)	Stability:	Stable
	Conditions to Avoid:	Contact with metals, organics.
	Incompatibility: (Materials to Avoid)	Strong corrosive agent will attack most metals. Contact with organics, nitrates, carbides, chlorates, etc. may cause ignition. Allyl compounds and aldehydes undergo polymerization – possibly violent.
	Hazardous Decomposition Products:	Sulfur oxides at high temperature. Reacts with above to form hydrogen cyanide and hydrogen sulfide.
	Hazardous Polymerization:	Will not occur
	Conditions to Avoid:	All contact with organic substances and most metals.
HEALTH HAZARDS	Acute:	3rd degree burns. Severe respiratory, skin and eye irritant. Bronchitis laryngeal and pulmonary edema may result.
	Signs and Symptoms of Exposure:	Prickling or burning sensation of skin and mucous membranes. Coughing, sneezing, tightness of chest, difficulty breathing.
	Medical Conditions Generally Aggravated by Exposure:	Any pre-existing respiratory disease, for example emphysema.

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HEALTH HAZARDS (continued)

Chemical Listed as Carcinogen or Potential Carcinogen:	I.A.R.C. Monographs: A limited study of refinery workers suggested a possible link between sulfuric acid exposure and laryngeal cancer. However, due to the small number of workers involved and the mixed exposure to several other materials including diethylsulfate (an I.A.R.C. and NTP carcinogen), there is no cause-and-effect relationship that can be inferred from the data available. These studies have been conducted for various industries, but no studies of battery acid manufacturing facilities have been included. The overall weight of evidence from animal toxicity and human epidemiological studies show no relationship between cancer and sulfuric acid exposure.
National Toxicology Program:	NO
OSHA:	NO
CAL/OSHA:	NO
Prop65:	NO
Emergency & First Aid Procedures:	Speed in removing acid is essential. Treat most urgent symptoms first: cessation of breathing, eye injury, skin contact, shock. Seek medical assistance even if injury appears slight. Give physician detailed account of incident.

RECOMMENDATIONS TO PHYSICIAN

While the patient is being transported to a medical facility, apply compresses of iced water. If medical treatment must be delayed, immerse the affected area in iced water. If immersion is not practical, compresses of iced water can be applied. Avoid freezing tissues.

Note to Physician:	Continued washing of the affected area with cold or iced water will be helpful in removing the last traces of sulfuric acid. Creams or ointments should not be applied before or during the washing phase of the treatment.

ROUTES OF ENTRY:

Inhalation:	Remove from exposure. CPR, if indicated. Give oxygen.
Eyes:	Flush immediately with large amounts of water for at least 15 minutes. Hold eyelids open during flushing.
Skin:	Flush immediately with large amounts of water. Remove contaminated clothing and shoes (this can be done while under shower).
Ingestion:	Do not induce vomiting. Give large amounts of milk, milk of magnesia or table oil or fresh eggs. Use water when nothing else is available. Rinse mouth often.

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ROUTES OF ENTRY (Continued)	Conditions Aggravated by:	Individuals with pre-existing disease of the lungs may have increased susceptibility to the toxicity of excessive exposure.
SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES	Precautions to be Taken in Handling & Storage:	See “Unusual Fire and Explosion Hazards”. Do not store near organics. Hydrogen may be generated inside drums and tanks; avoid flames and sparks.
	Other Precautions:	Never add water to containers of acid. For spills, beware of acid reaction in sewers that may produce flammable hydrogen gas or toxic sulfides.
	Steps to be Taken in Case Material is Released or Spilled:	Wear full acid-protective gear. Remove sources of ignition. Neutralize spill with lime or soda ash, flush to on-site wastewater treatment system. Dike large spills. Do not wash into storm or sanitary sewer system. EPA and Superfund reportable discharge is 1000 lbs. Soak up small spills with dry sand, clay or diatomaceous earth.
	Waste Disposal Methods (Consult Federal, State and Local Regulations):	Flush as above. Neutralize with lime or soda ash, (a minimum of 5.2 pounds soda ash per gallon of battery fluid, electrolyte). Consult regulations. EPA hazardous waste D002 – corrosive and D003 – reactive if discarded without prior neutralization.
SPECIAL PROTECTION INFORMATION/CONTROL MEASURES:	Respiratory Protection:	When needed use NIOSH or MSHA approved half or full-face mask with acid gas cartridge. For high concentrations, use self-contained breathing unit.
	Ventilation:	Required
	Local Exhaust:	Yes
	Mechanical:	Ventilate storage tanks before entry.
	Protective Gloves:	Rubber
	Eye Protection:	Chemical goggles or full-face shield
	Other Protective Clothing or Equipment:	Rubber safety shoes/boots. Rubber apron or full suit if splashes are likely.
	Work/Hygienic Practices:	Prohibit smoking. Provide safety showers/eye washes near work site. Train employees in chemical handling practices.
	Maintenance of Contaminated Equipment:	Use same precautions as in “Special Precautions” above.
	Labeling Priority:	Battery Fluid, Acid, 8, UN2796, Pg. II